4) Soit $I = \int_0^1 \frac{1-x}{\sqrt{2x+1}}\,dx$.

b) Calculer I.

$$I = \int_0^1 \frac{1-u}{\sqrt{2u+1}}\,dx$$

on pose

$$u(x) = 1-u \longrightarrow u'(x) = -1$$

$$v'(x) = \frac{2\cdot 1}{2\sqrt{2u+1}} \longrightarrow v(x) = \sqrt{2u+1}$$

$$I = \left[(1-u)\cdot\sqrt{2u+1}\right]_0^1 + \int_0^1 \sqrt{2u+1}\,dx$$

$$= 0 - 1 + \frac{1}{2}\int_0^1 \frac{2\cdot\sqrt{2u+1}}{u'\cdot\sqrt{u}}\,dx$$

$$u'\cdot\sqrt{u} \longrightarrow \frac{2}{3}\,u\sqrt{u}$$

$$= -1 + \left[\frac{1}{2}\cdot\frac{2}{3}(2u+1)\cdot\sqrt{2u+1}\right]_0^1$$

$$= -1 + \left[\frac{1}{3}(2u+1)(\sqrt{2u+1})\right]_0^1$$

$$= -1 + \sqrt{3} - \frac{1}{3}$$

$$= \sqrt{3} - \frac{4}{3} \simeq 0,4$$